

WHAT IS CLAIMED:

1. A microvalve for controlling fluid flow, comprising:
  - (a) a body portion having at least one opening formed therein;
  - (b) a shutter located adjacent to and substantially parallel with said body portion; and
  - (c) a drive mechanism for causing said shutter to pivot with respect to said body portion so that said shutter is brought into and out of alignment with said opening of said body portion, wherein said microvalve is in a closed position and an open position, respectively.
2. The microvalve of claim 1, said drive mechanism causing said shutter to pivot by impacting a portion of said shutter.
3. The microvalve of claim 1, further comprising a first stopper to limit pivoting of said shutter in a clockwise direction.
4. The microvalve of claim 1, further comprising a second stopper to limit pivoting of said shutter in a counter-clockwise direction.
5. The microvalve of claim 1, said drive mechanism further comprising:
  - (a) a first impact comb drive for causing said shutter to pivot in a clockwise direction; and
  - (b) a second impact comb drive for causing said shutter to pivot in a counter-clockwise direction.
6. The microvalve of claim 5, said shutter further comprising a portion extending from a periphery thereof which is impacted by said first and second impact comb drives.
7. The microvalve of claim 6, said shutter impact portion being located substantially opposite a pivot point thereof.

8. The microvalve of claim 5, wherein said shutter is impacted by said first and second impact comb drives by a predetermined force so as to control an amount of pivoting by said shutter within a designated range of motion.

9. The microvalve of claim 1, wherein power to operate one of said first and second impact comb drives is provided only during a change in position of said shutter.

10. The microvalve of claim 1, further comprising a dimple extending between said shutter and said body portion, wherein fluid flow is restricted by a contact line between said dimple and said body portion when said microvalve is in said closed position so that a predetermined amount of fluid is able to leak through said microvalve.

11. The microvalve of claim 1, said drive mechanism further comprising:

- (a) at least one actuator;
- (b) a rotation gear hub location adjacent to and operatively connected to said actuator; and
- (c) a rotation gear operatively connected to said rotation gear hub and said shutter;

wherein said rotation gear hub is caused to rotate upon being driven by said actuator so that said rotation gear is caused to rotate said shutter pivots to a desired position with respect to said body portion.

12. The microvalve of claim 11, wherein said shutter is pivotable to a position intermediate said open and closed positions to permit a proportional amount of fluid flow therethrough.

13. The microvalve of claim 11, wherein said rotation gear hub is rotatable clockwise and counter-clockwise so as to pivot said shutter between said open and closed positions.

14. The microvalve of claim 1, further comprising a controller for providing power to said drive mechanism.

15. The microvalve of claim 1, said drive mechanism further comprising:

- (a) at least one actuator;
- (b) a rotation gear hub located adjacent to and impacted by said actuator;
- (c) a rotation gear operatively connected to said shutter; and
- (d) a linear gear operatively connected to said rotation gear hub at a first end  
and operatively connected to said rotation gear at a second end;

wherein said rotation gear hub is caused to rotate upon being driven by said actuator so that said rotation gear is indirectly caused to rotate and said shutter pivots to a desired position with respect to said body portion.

16. The microvalve of claim 15, wherein said shutter is pivotable to a position intermediate said open and closed positions to permit a proportional amount of fluid flow therethrough.

17. The microvalve of claim 15, wherein said rotation gear hub is rotatable clockwise and counter-clockwise so as to pivot said shutter between said open and closed positions.